

Description of two new species of *Cyclogastrella* Bukovskij (Chalcidoidea: Pteromalidae) from China

Tianyang JIAO^{1,2}, Hui XIAO¹①

1. Key Laboratory of Zoological Systematics and Evolution, Institute of Zoology, Chinese Academy of Sciences, Beijing 100101, China

2. Graduate University of Chinese Academy of Sciences, Beijing 100049, China

Abstract: Two new species of *Cyclogastrella* Bukovskij, *Cyclogastrella tibetica* sp. nov. and *Cyclogastrella qinghaiensis* sp. nov., are described and illustrated. *C. leucaniae* Liao is transferred from *Cyclogastrella* to the genus *Dibrachys* Förster, 1856 as *Dibrachys leucaniae* (Liao, 1987) com. nov. A key to Chinese *Cyclogastrella* females and diagnoses for Chinese species are provided.

Key words: Chalcidoidea; taxonomy; key

中国圆腹金小蜂属二新种记述（膜翅目：金小蜂科）

矫天扬^{1,2}, 肖晖¹①

1. 中国科学院动物研究所动物进化与系统学院级重点实验室, 北京 100101; 2. 中国科学院研究生院生命科学学院, 北京 100049

摘要: 记述圆腹金小蜂属 *Cyclogastrella* Bukovskij, 1938 二新种: 藏圆腹金小蜂 *Cyclogastrella tibetica* Jiao & Xiao sp. nov. 和青海圆腹金小蜂 *Cyclogastrella qinghaiensis* Jiao & Xiao sp. nov.。将粘虫蛹金小蜂 *Cyclogastrella leucaniae* Liao, 1987 移入黑青金小蜂 *Dibrachys* Förster, 作为新组合 *Dibrachys leucaniae* (Liao, 1987)。研究提供了该属中国纪录种的分种检索表。研究标本保存于中国科学院动物研究所动物标本馆。

关键词: 小蜂总科; 分类; 检索表

Introduction

The genus *Cyclogastrella* was described by Bukovskij in 1938, with the type species *Cyclogastrella quercina* Bukovskij. Nikol'skaya (1952) synonymized *Cyclogastrella* under *Pseudomicromelus*, and treated *quercina* as a synonym of *P. deplanatus* Nees. Graham (1956) examined the materials and thought that this species was better placed in *Cyclogastrella* Bukovskij. Graham (1956) described the genus *Cyclogastrella* in his study and provided the diagnostic characters for *Cyclogastrella*: the antennae inserted on a level with ventral edge of eyes instead of well below that level; face below antennae less strongly receding towards mouth; terminal margin of the fore wing is ciliated.

Up to the present, eight valid species have been recognized in *Cyclogastrella* (Noyes 2014). Five species, *C. chypealis* Bouček, *C. flavius* (Walker), *C. simplex* (Walker), *C. Arida*

Accepted 29 December 2014. Published 25 June 2015. Online published 21 May 2015.

①Corresponding author, E-mail: xiaoh@ioz.ac.cn

Dzhanokmen et Grissell, and *C. plana* Dzhanokmen et Grissell were described from the Holarctic Region. *C. leucaniae* Liao and *C. nigra* Sureshan are from the Oriental Region. And *C. shorti* Bouček is Australasian (Noyes 2014). However, following study of material obtained during recent expeditions and reexamination of the collection in IZCAS, it has become apparent that *C. leucaniae* Liao, 1987 was misidentified.

The purposes of our study are: to describe two new species, *C. tibetica* sp. nov. and *C. qinghaiensis* sp. nov.; to transfer *C. leucaniae* Liao, 1987 to the genus *Dibrachys* Förster; and to review all known Chinese *Cyclogastrella* species. As a result two species of *Cyclogastrella* are recorded for the fauna of China.

Material and methods

Specimens of the newly described species were swept using an insect net and preserved in 75% ethanol. They were subsequently air dried, point-mounted, and examined with a Nikon SMZ1500 stereomicroscope. Photographs were obtained using a Nikon Multizoom AZ100 system, and plates for illustrations were compiled using Adobe Photoshop software. All specimens are deposited in the Institute of Zoology, Chinese Academy of Sciences, Beijing, China (IZCAS).

Morphological terminology follows that of Bouček (1988), Gibson *et al.* (1997) and Gibson (2009). Body length (i.e. length of body excluding the ovipositor sheaths) is measured in millimeters, but other measurements are relative. Abbreviations of morphological terms used are: fu_n — funicular segment; eyes space — the minimal distance between the eyes in frontal view; POL — posterior ocellar distance; OOL — ocellocular distance; Gt_n — gastral tergum.

Taxonomy

Genus *Cyclogastrella* Bukovskij, 1938

Cyclogastrella Bukovskij, 1938: 153–156. Type-species: *Cyclogastrella quercina* Bukovskij, by monotypy. Graham, 1956: 258; Peck *et al.*, 1964: 51; Bouček, 1965: 26–27; Graham, 1969: 796–800; Bouček, 1988: 436.

Diagnosis. Body stout and broad; gaster circular, shorter than thorax in the female; occiput without occipital carina; antennae short, formula 11263 or 11353, antennal insertion rather low on the face, but distinctly above lower ocular line; genae very short, eyes rather large; clypeus medially protruding and lower margin more or less bilobed; mandibles broad and 4-toothed; pronotum not edged anteriorly; notauli incomplete; scutellum slightly convex and frenal line absent; fore wing with short fringe except tip of postmarginal vein to tip of fore wing bare; marginal vein about 1.5 times as long as stigma vein; postmarginal vein hardly longer or as long as stigma vein; hind leg with one spur.

Biology notes. Members of this genus have been recorded as parasites of Lepidoptera (Tortricidae, Gelechiidae, Geometridae, Noctuidae, Yponomeutidae) with a few recorded from Hymenoptera (Bethyridae, Ichneumonidae). Two European species develop as parasites of several species of Tortricidae (Lepidoptera) (Bouček 1988).

Remarks. *Cyclogastrella* is distinguished from *Coelopisthia* by the face not protuberant at antennal insertion (distinctly protuberant in *Coelopisthia*), fore wing with marginal fringe (absent in *Coelopisthia*). *Cyclogastrella* is similar to *Tritneptis* but the face not protuberant at antennal insertion (distinctly protuberant in *Tritneptis*), gaster subcircular (fusiform in *Tritneptis*).

Discussion. After examining the holotype of *Cyclogastrella leucaniae* Liao, 1987 (Holotype. ♀, IOZ(E) 1222038, **China**, Yunnan, Lijiang, 23-XI-1975, ex. pupae of *Leucania separate* (Walker), leg. Yinghua LI, det. Dingxi LIAO, 1987; Paratypes. 2♀1♂, **China**, Yunnan, Lijiang, 06-XII-1977, leg. Yinghua LI, det. Dingxi LIAO), we found that this species agrees well with the genus *Dibrachys* Förster, 1856 in the following characters: female gaster ovate and apex not blunt (Fig. 17); occiput with transverse ridge; and fore wing without marginal fringe (Fig. 18). Therefore we transfer the species *Cyclogastrella leucaniae* Liao to the genus *Dibrachys* Förster.

Meanwhile we compared the species with *Dibrachys cavus* (Walker) (examined materials: BMNH, TYPE HYM 5.2987; 2♀, Sk. Ahus, 04-V-1979, leg. K. -J. Hedqvist, det. K. -J. Hedqvist) and *Dibrachys boarmiae* (Walker) (examined materials: 1♀2♂, N. Zealand, Lincoln, Christchurch, 1988, leg. B. J. Donovan, det. Z. Bouček, 1988), and found that *Cyclogastrella leucaniae* Liao is different from the two species of *Dibrachys* by the following characters: body slightly stout (Fig. 17); head distinctly wider than thorax; gaster short ovate, slightly longer than thorax, but shorter than head and thorax combined; and with some other characters differing slightly. Therefore the species *Cyclogastrella leucaniae* Liao is transferred to *Dibrachys* as *Dibrachys leucaniae* (Liao 1987) comb. nov.

Key to species of *Cyclogastrella* from China (female)

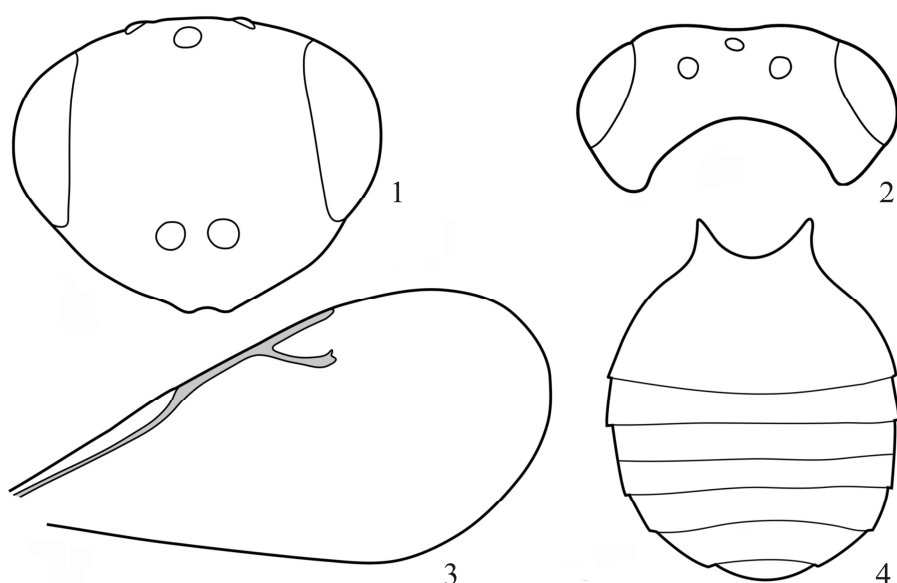
1. Postmarginal vein $1.19\times$ as long as stigmal vein; funicular segment slightly transverse, at most quadrate; median carina complete on propodeum; clypeus with epistomal sulcus distinct.....*C. tibetica* sp. nov.
- . Postmarginal vein $1.39\times$ as long as stigmal vein; funicular segment slightly longer than it is broad; median carina incomplete on propodeum; clypeus without epistomal sulcus.....*C. qinghaiensis* sp. nov.

1. *Cyclogastrella tibetica* sp. nov. (Figs. 1–8)

Description. Female. Length = 1.7 mm. Body (Figs. 5, 6) black except gaster black-brown. Antenna brown except scape yellowish brown, pedicel pale brown. Wings hyaline with pale smoked. Legs with coxae concolorous with mesosoma; femora brown in central part, tibiae and claws yellowish brown (Fig. 6). Ovipositor invisible.

Head in anterior view about $1.29\times$ as high as wide (Fig. 1); eye space $1.38\times$ eye height; eye height $0.62\times$ head height and inner margin of eyes parallel; upper face and lower face with finely raised reticulation (Fig. 7); scrobe distinct, reticulated densely and not reaching lower anterior ocellus. Clypeus with epistomal sulcus distinct; lower margin of clypeus protruding as two obtuse teeth (Figs. 1, 7), paraclypeal margin slightly protrudent and malar depression distinct. Head in lateral view malar sulcus indistinct; eye height $1.48\times$ eye width, $2.83\times$ malar space. Head in dorsal view $2\times$ as wide as long (Fig. 2), vertex convex, occipital carina absent; anterior and posterior ocelli on obtuse angle; POL $1.6\times$ OOL; eye length $3.58\times$ as long as temple. Antenna (Figs. 7, 8) not clavate, three anelli transverse; antenna inserted at lower face, upper margin of torulus at lower ocular line; scape not reaching anterior ocellus, about $0.88\times$ eye height, $2.4\times$ as long as broad laterally; pedicel and flagellum combined $0.83\times$ as long as

head width; Fu_1 , Fu_2 and Fu_3 quadrate, Fu_4 and Fu_5 slightly transverse; each funicular segment bearing one row of longitudinal sensilla; clava $2.67\times$ as long as its greatest width.



Figures 1–4. *Cyclogastrella tibetica* sp. nov. (♀). 1. Head, front view; 2. Head, dorsal view; 3. Fore wing; 4. Gaster, dorsal view.

Thorax in dorsal view distinctly narrower than head width, head width about $1.25\times$ as long as mesosoma; mesosoma slightly convex in lateral view (Fig. 6), $1.52\times$ as long as broad. Pronotum $1/6$ length of mesoscutum, collar short and not margined, collum sloping from anterior margin of collar. Mesoscutum $1.72\times$ as wide as long, notauli incomplete; scutellum as long as broad, frenal line absent; propodeum with median carina and plica complete, propodeum $1/2$ length of scutellum, nucha short and with irregular transverse carinulae. Fore wing $2.22\times$ as long as wide (Fig. 3); fore wing with marginal fringe except a short section bare (tip of postmarginal vein to tip of fore wing); costal cell bare on upper surface and with setae on ventral surface; basal vein with setae, basal cell setose on base area; speculum only reaching base of marginal vein; marginal vein $1.63\times$ as long as postmarginal vein; postmarginal vein $1.19\times$ as long as stigmal vein.

Metasoma shorter than mesosoma ($0.84\times$ mesosoma); petiole very short and invisible in dorsal view; gaster subcircular (Fig. 4), apex blunt, $1.15\times$ as long as wide, $1.16\times$ as wide as mesosoma; Gt_1 $1/3$ length of gaster.

Male. Body length 1.5 mm. Head and mesosoma metallic black, gaster black brown. Antenna brown except scape brownish yellow on basal half and pale brown on apical half, pedicel pale brown; antenna with 2 anelli, each funicular segment with two rows of sensilla. Propodeum with median carina and plica complete. Fore wing setose on basal vein, basal cell hairy on apical part, costal cell with irregular hairs. Gaster with petiole transverse, gaster oval.

Holotype. ♀, **China**, Tibet, Gyaca Co., 28-VI-1997, coll. Chaodong ZHU (IZCAS).
Paratype. 1♂, **China**, Tibet, Nangxian Co., 3100 m, 29-VI-1997, coll. Chaodong ZHU

(IZCAS).

Etymology. The specific epithet is from the name of the type locality.

Remarks. This new species is similar to *C. simplex* (Walker) with anterior margin of clypeus having two short lobes between which there is only a shallow emargination, but postmarginal vein $1.19\times$ as long as stigmal vein (at most as long as stigma vein in *C. simplex*), basal vein and basal cell with setae (bare in *C. simplex*).

Biology. All specimens were swept from a grassy area; the host is unknown.

Distribution. China (Tibet).



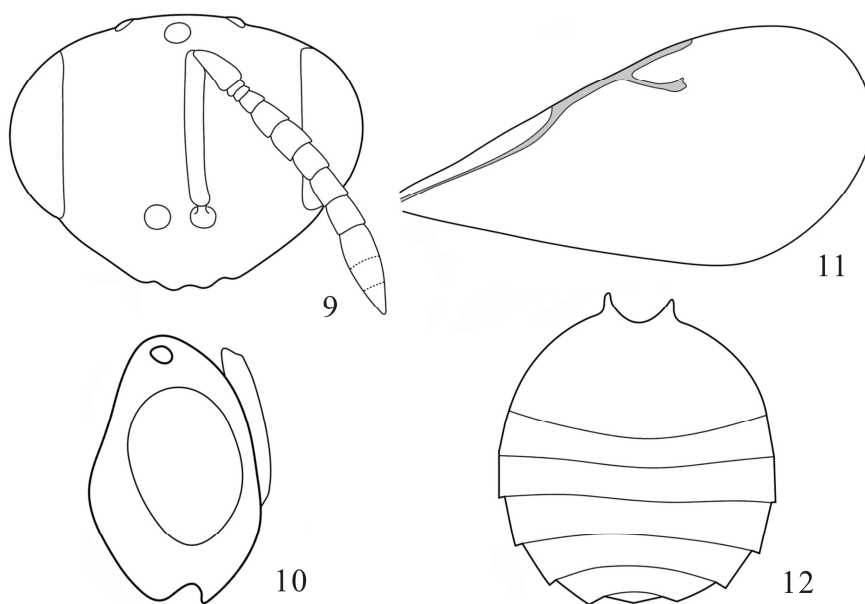
Figures 5–8. *Cyclogastrella tibetica* sp. nov. (♀). 5. Body, dorsal view; 6. Body, lateral view; 7. Head, front view; 8. Head, lateral view.

2. *Cyclogastrella qinghaiensis* sp. nov. (Figs. 9–16)

Description. Female. Length = 2 mm. Body (Figs. 13, 14) black except gaster black-brown. Antenna brown except scape yellowish brown, pedicel pale brown. Wings hyaline without pale smoke. Legs with coxae concolorous with mesosoma; femora brown in central part, tibiae and claws yellowish brown. Ovipositor invisible.

Head in anterior view about $1.27\times$ as high as wide (Figs. 9, 15); eye space $1.45\times$ eye height; eye height $0.62\times$ head height, inner margin of eyes parallel; upper face and lower face with finely raised reticulation; scrobe reticulated densely and not reaching lower anterior ocellus. Clypeus without epistomal sulcus, lower margin of clypeus protruding as two obtuse teeth (Figs. 9, 15), paraclypeal margin also distinctly protrudent and malar depression distinct. Head in lateral view (Fig. 10) malar sulcus indistinct; eye height $1.68\times$ eye width, $2.36\times$ malar space. Head in dorsal view $2.2\times$ as wide as long (Fig. 16), vertex slightly convex, occipital carina absent; POL $1.64\times$ OOL; eye length $4\times$ as long as temple. Antenna (Figs. 9, 15)

antenna inserted at lower face, lower margin of torulus at lower ocular line; three anelli transverse; scape not reaching anterior ocellus, about $0.9\times$ eye height, $2\times$ as long as broad laterally; pedicel and flagellum combined $0.93\times$ as long as head width; each funicular segment quadrate to slightly longer than width, each bearing one row of longitudinal sensilla; clava not clavate, $2.43\times$ as long as its greatest width.



Figures 9–12. *Cyclogastrella qinghaiensis* sp. nov. (♀). 9. Head, front view; 10. Head, lateral view; 11. Fore wing; 12. Gaster, dorsal view.

Thorax in dorsal view distinctly narrower than head width, head width about $1.2\times$ as long as mesosoma; mesosoma slightly convex in lateral view (Figs. 13, 14), $1.3\times$ as long as broad. Pronotum with short collar, collar not carinate. Mesoscutum $2\times$ as wide as long, notauli incomplete; scutellum as long as broad, frenal line absent; propodeum without median carina, plica complete, propodeum $1/2$ length of scutellum, nucha very short and with irregular transverse carinulae. Fore wing $2.1\times$ as long as wide (Figs. 11, 13); fore wing with marginal fringe except a short section bare (tip of postmarginal vein to tip of fore wing); costal cell bare on upper surface and with setae on ventral surface; basal vein with setae, basal cell bare; speculum only reaching base of marginal vein; marginal vein $1.67\times$ as long as postmarginal vein; postmarginal vein $1.39\times$ as long as stigmal vein.

Metasoma slightly shorter than mesosoma ($0.92\times$ mesosoma); petiole very short and invisible in dorsal view; gaster subcircular (Fig. 8), apex blunt, $1.1\times$ as long as wide, $1.1\times$ as wide as mesosoma; Gt_1 length $0.43\times$ gaster.

Male. Length = 1.9 mm. Head and mesosoma bronze, gaster dark brown with metallic reflection. Antenna brown to yellowish brown except pedicel and two anelli pale brown; antenna with 2 transverse anelli, each funicular segment longer than its broad respectively, and with two rows of sensilla. Gaster $1.63\times$ as long as broad; Gt_1 length $0.4\times$ gaster, hind margin

curved in the middle.

Remarks. This new species resembles *Cyclogastrella shorti* Bouček with epistomal sulcus absent on clypeus, but pedicel and flagellum combined $0.93\times$ as long as head width ($0.64\times$ in *C. shorti*), propodeum without median carina (median carina complete in *C. shorti*), and the postmarginal vein $1.39\times$ stigma vein (at most $1.1\times$ in *C. shorti*).

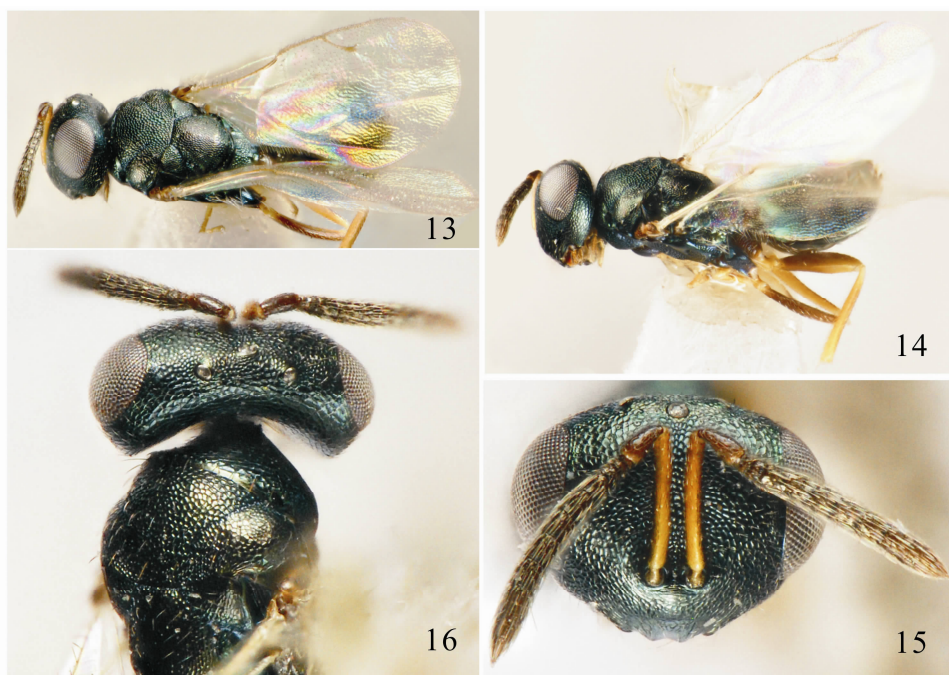
Holotype. ♀, **China**, Qinghai, Golmud C., 14-IX-2001, coll. Chaodong ZHU (IZCAS).

Paratypes. 1♀1♂, same data as holotype (IZCAS).

Biology. The host is unknown.

Etymology. The specific epithet is from the name of the type locality, Qinghai Province.

Distribution. China (Qinghai).



Figures 13–16. *Cyclogastrella qinghaiensis* sp. nov. (♀). 13. Body, dorsal view; 14. Body, lateral view; 15. Head, front view; 16. Head and thorax, dorsal view.

Acknowledgements

We express our thanks to the Royal Society KC Wong Fellowship for offering the opportunity to study in the BMNH, and Dr. Zdenek Bouček and Dr. John Noyes for helping us to examine the *Cyclogastrella* in the BMNH collections. This work was supported by the Presidential Foundation of the CAS, Ministry of Science and Technology of China (2012FY111100, 2011FY120200), the National Natural Science Foundation of China (31372238) and the Knowledge Innovation Program of the Chinese Academy of Sciences (KSCX2-EW-Z-8).

References

- Bouček Z. 1965. A review of the Chalcidoid fauna of the Moldavian SSR, with descriptions of new species (Hymenoptera). *Sborník Faunistických Prací Entomologického Oddelení Národního Musea v Praze*, 11: 5–37.
- Bouček Z. 1988. *Australasian Chalcidoidea (Hymenoptera). A Biosystematic Revision of Genera of Fourteen Families, with a Reclassification of Species*. CAB International, Wallingford, 832 pp.
- Bukovskij W. 1938. Neue und wenig bekannte Chalcididen (Hymenoptera). I. *Entomologicheskoe Obozrenie*, 27(3/4): 152–171.
- Gibson AP. 2009. Revision of New World Spalangiinae (Hymenoptera: Pteromalidae). *Zootaxa*, 2259: 1–159.
- Gibson AP, Huber JT & Woolley JB. 1997. *Annotated Key to the Genera of Nearctic Chalcidoidea (Hymenoptera)*. NRC Research Press, 794 pp.
- Graham MWRdV. 1956. A revision of the Walker types of Pteromalidae (Hym., Chalcidoidea). Part 2 (including descriptions of new genera and species). *Entomologist's Monthly Magazine*, 92: 246–263.
- Graham MWRdV. 1969. The Pteromalidae of north-western Europe (Hymenoptera: Chalcidoidea). *Bulletin of the British Museum (Natural History) (Entomology)*, 16(supplement): 796–800.
- Liao DX, Li XL, Pang XF & Chen TL. 1987. Hymenoptera: Chalcidoidea (1). *Economic Insect Fauna of China*. Science Press, Beijing, 241 pp.
- Nikol'skaya M. 1952. Chalcids of the fauna of the USSR (Chalcidoidea). *Opređeliteli po Faune SSSR, Zoologicheskim Institutom Akademii Nauk SSSR, Moscow and Leningrad*, 44:1–575.
- Noyes JS. 2014. Universal Chalcidoidea Database. World Wide Web electronic publication. Available from: <http://www.nhm.ac.uk/entomology/chalcidoids/index.html> (Accessed 15 May 2014).
- Peck O, Bouček Z & Hoffer A. 1964. Keys to the Chalcidoidea of Czechoslovakia (Insecta: Hymenoptera). *Memoirs of the Entomological Society of Canada*, 34: 51.